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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/026,935

12/18/2001

Alan Sullivan

30231/40

7292

7590

09/03/2004

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EXAMINER

TRAN, TAM D

ART UNIT

PAPER NUMBER

2676

DATE MAILED: 09/03/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No. 10/026,935	Applicant(s) SULLIVAN ET AL.	
	Examiner Tam D Tran	Art Unit 2676	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 03 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 07/21/2004.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1,2,4-9,12,13,16-23,47,48,50-55,58,59 and 63-91 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1,2,4-9,12,13,16-23,48,50-55,58,59,62-69 and 76-91 is/are rejected.
- 7) ☒ Claim(s) 6,8,52,54 and 70-75 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input checked="" type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. <u>6/20/04</u> |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Claim Rejections - 35 USC § 102

1. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims 1, 2, 4-9, 12, 13, 16-23, 48, 50, 51-55, 58, 59, 62-69, 76-91, are rejected under 35

U.S.C. 102(b) as being anticipated by Kaufman et al. (USPN 5760781), hereinafter simply Kaufman.

2. In regard to claims 1, 47, Kaufman teaches a system and method of processing three-dimensional image data for a three-dimensional volumetric display having a plurality of display elements (voxels), the method comprising: generating three-dimensional image data, comprising (x,y,z) coordinate and color information, wherein the z-coordinate information represents image depth information; see col.2 lines 60-68, col.4 lines 33-40, and storing the three dimensional image data at locations in a multiplanar (cubic frame buffer) frame buffer in accordance with the z-coordinate information. See col.6 lines 20-48.

3. In regard to claims 2, 48, Kaufman teaches a system and method of displaying a three-dimensional image wherein the storing comprises: reading the z-coordinate information; scaling the z-coordinate information within a range corresponding to one or more display elements in the three-dimensional volumetric display upon which the three-dimensional image is to be displayed; and assigning memory locations in the multiplanar frame buffer for the three-

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dimensional image data based on the scaled z-coordinate information (distance between rays increase which read on scaling the z-coordinate information within a range). See col.8 lines 55-60.

4. In regard to claims 4, 50, Kaufman teaches a system and method of displaying a three-dimensional image wherein the storing comprises storing image data having substantially identical z-coordinate information in memory locations of the frame buffer that are logically substantially proximate. See col.6 lines 20-25.

5. In regard to claims 5, 51, Kaufman teaches a system and method of displaying a three-dimensional image further comprising displaying an image on a display having addressable (x,y,z) coordinates. See col.6 lines 38-42.

6. In regard to claims 7, 53, Kaufman teaches a system and method of displaying a three-dimensional image further comprising displaying an image on a display having addressable (r, Y, and theta) coordinates (x,y,z coordinates). See col.6 lines 38-42.

7. In regard to claims 9, 55, Kaufman teaches a system and method of displaying a three-dimensional image wherein storing comprises: providing a first memory at least as large as the frame buffer; filling the first memory with the three dimensional image data; and transmitting the contents of the first memory location to the frame buffer in a single operation. See col.6 lines 20-25.

8. In regard to claims 12, 58, Kaufman teaches a system and method of displaying a three-dimensional image further comprising transmitting the three-dimensional image data to a display in accordance with the z-coordinate information. See col.6 lines 38-42.

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9. In regard to claims 13, 59, Kaufman teaches a system and method of displaying a three-dimensional image wherein the image data further comprises transparency information (translucency) and brightness information. See col.4 lines 32-40.

10. In regard to claims 16, 62, Kaufman teaches a system and method of displaying a three-dimensional image further comprising displaying an image on a three dimensional volumetric display. See Fig.3.

11. In regard to claims 17, 63, Kaufman teaches a system and method of displaying a three-dimensional image wherein the three dimensional volumetric display comprises multiple planes upon which image data is displayed. See col.15 lines 45-65

12. In regard to claims 18, 64, Kaufman teaches a system and method of displaying a three-dimensional image wherein the three dimensional volumetric display comprises a plurality of self-luminescent optical elements (every pixel on the screen having optical element associated with it). See col.2 lines 60-65.

13. In regard to claims 19, 65, Kaufman teaches a system and method of displaying a three-dimensional image wherein the three dimensional volumetric display is a swept-volume display (volume projection image). See col.2 lines 60-67.

14. In regard to claims 20, 66, Kaufman teaches a system and method of displaying a three-dimensional image wherein generating comprises generating the three-dimensional image data with a personal computer. See col.1 lines 35-37.

15. In regard to claims 21, 67, Kaufman teaches a system and method of displaying a three-dimensional image wherein generating comprises converting data corresponding to a three-dimensional image into data corresponding to a plurality of two-dimensional cross-sectional

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images (slices of voxels data that are parallel) of the three-dimensional image. See col.2 lines 60-67.

16. In regard to claims 22, 68, Kaufman teaches a system and method of displaying a three-dimensional image wherein the generating comprises generating the three-dimensional image data using application program interface calls (using computer graphic system which has graphic programs). See col.1 lines 30-34.

17. In regard to claims 23, 69, Kaufman teaches a system and method of displaying a three-dimensional image wherein generating comprises generating data indicating a plurality of geometric primitives (lines and points) that define three-dimensional image. See col.13 lines 15-25.

18. In regard to claims 76-79, Kaufman teaches a system and method of displaying a three-dimensional image, wherein the storing comprises storing the three-dimensional image data having substantially identical z-coordinate information in memory locations within one common physical partition of the multiplanar frame buffer (cubic frame buffer). See col.6 lines 20-45.

19. In regard to claims 80, 81, Kaufman teaches a system and method of displaying a three-dimensional image, wherein the multiplanar frame buffer (cubic frame buffer) is located in the three-dimensional volumetric display. See col.6 lines 20-45.

20. In regard to claims 82, 83, Kaufman teaches a system and method of displaying a three-dimensional image, wherein the first memory comprises a multiplanar frame buffer (cubic frame buffer). See col.6 lines 20-45.

21. In regard to claims 84, 88, Kaufman teaches a system and method of displaying a three-dimensional image, wherein the storing comprises: processing the three dimensional image data;

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assigning memory locations in the multiplanar frame buffer (cubic frame buffer) for the three dimensional image data in accordance with the (x,y,z) coordinate information; and transferring the processed three dimensional image data to the assigned memory locations in the multiplanar frame buffer (cubic frame buffer). See col.6 lines 20-49.

22. In regard to claims 85, 89, Kaufman teaches a system and method of displaying a three-dimensional image, wherein the processing comprises performing depth testing. See col.6 lines 38-45.

23. In regard to claim 86, 90, Kaufman teaches a system and method of displaying a three-dimensional image, wherein the processing comprises performing multiplanar antialiasing. See col.8 lines 43-55.

24. In regard to claim 87, 91, Kaufman teaches a system and method of displaying a three-dimensional image, wherein the processing comprises performing alpha blending. See col.10 lines 15-20.

Allowable Subject Matter

25. Claims 6, 8, 52, 54, 70-75, are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

Conclusion

26. Any inquiry concerning this communication or earlier communications from the examiner should be directed to **Tam D. Tran** whose telephone number is **703-305-4196**. The examiner can normally be reached on MON-FRI from 8:30 – 5:30.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's

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supervisor, **Matthew Bella** can be reached on **703-308-6829**.

Any response to this action should be mailed to:

Commissioner of Patents and Trademarks

Washington, D.C. 20231

or faxed to:

(703) 872-9314 (for Technology Center 2600 only)


Hand-delivered response should be brought to Crystal Park II, 2121 Crystal Drive,
Arlington, VA, Sixth floor (Receptionist).

Any inquiry of a general nature or relating to the status of this application or proceeding
should be directed to the Technology Center 2600 Customer Service Office whose
telephone number is (703) 306-0377.

Tam Tran

TT
Examiner

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Kee M. Tung
Primary Examiner